Remarks

In a first Office Action dated November 18, 2005, U.S. Patent 6,730,570 to Shin et al. was erroneously relied upon.

Although, in response to the first Office Action, the applicants clearly pointed out the error of applying Shin et al. in the subject application, a second Office Action made final and again applying Shin et al. to the subject application was issued on May 9, 2006. After applicants' second response, the second Office Action made final was withdrawn.

Then, a third, non-final Office Action dated September 20, 2006 was issued. Applicants thank the examiner for now withdrawing the rejections of the third Office Action in view of applicants' response.

However, a fourth, non-final Office Action has now been issued in the subject application.

In the fourth, non-final Office Action, dated March 21, 2007, claim 21 was rejected under 35 U.S.C. 102(b) over U.S. Patent No. 5,926,710 to Tseng. In addition, claims 1, 2, 5, 10, 12, 14, and 15 were rejected under 35 U.S.C. 103(a) over Tseng in view of U.S. Patent No. 6,806,549 to Tomita and in view of U.S. Patent No. 5,779,927 to Lo; claim 3 was rejected under 35 U.S.C. 103(a) over Tseng in view of Tomita, Lo, and U.S. Patent Pub. No. 2002/0168830 to DeBoer et al.; claim 8 was rejected under 35 U.S.C. 103(a) over Tseng in view of Tomita, Lo, and U.S. Patent No. 6,010,955 to Hashimoto; claim 9 was rejected under 35 U.S.C. 103(a) over Tseng in view of Tomita, Hashimoto, and U.S. Patent No. 6,479,341 to Lu; claim 13 was rejected under 35 U.S.C. 103(a) over Tseng in view of Tomita, Lo, and U.S. Patent No. 5,817,562 to Chang et al.; claims 16-19 were rejected under 35 U.S.C. 103(a) over Tseng in view of Tomita and U.S. Patent No. 6,342,416 to Kim et al.; and claim 20 was rejected under 35 U.S.C. 103(a) over Tseng in view of Tomita, Lo, and Kim et al.

Applicants have amended claims 1, 5, and 21. Thus, claims 1-3, 5, 8-10, and 12-21 remain pending for consideration.

> Regarding amended claim 21, the Office Action states that
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> Tseng also teaches performing dry etching process (same as plasma etching) to etch the first insulating layer **24** until the etch stop layer **22** over the source region **17**, **19**, the drain region **17**, **19** and the sidewall spacers **20** is exposed to form self-aligned contact holes **2** in the first interlayer insulating layer **24** over the source region **17**, **19** and the drain region **17**, **19** respectively (column 5, lines 37-41).

(See Office Action at page 4, paragraph 6, lines 1-5, emphasis added).

However, Tseng fails to disclose at column 5, lines 37-41 or anywhere else, "performing the dry etching process to etch the first interlayer insulating film until portions of the etch stop layer disposed over the source region, the drain region *and the sidewall spacers* are exposed," as recited by amended claim 21. Rather, Tseng states that "[c]onventional photolithographic techniques and anisotropic plasma etching are used to form node contact openings 2 in the second and first insulating layers (24 and 22) to one of the two source/drain contact areas 19(N^+) to provide node contacts for the stacked storage capacitors." (See Tseng at column 5, lines 36-40).

The Office Action characterizes second insulation layer 24 of Tseng as the first interlayer insulating film recited in amended claim 21, and further characterizes first insulation layer 22 of Tseng as the etch stop layer recited in amended claim 21. In addition, Tseng discloses "sidewall spacers 20". (See, Tseng at column 5, line 8).

Referring now to FIG. 2 of Tseng, it is clear that the portions of first insulating layer 22 disposed over sidewall spacers 20 remain covered by second insulation layer 24 even after node contact openings 2 are formed. Thus, FIG. 2 of Tseng clearly fails to show "performing the dry etching process to etch the first interlayer insulating film until portions of the etch stop layer disposed over . . . the sidewall spacers are exposed," as recited in amended claim 21 for at least the reason that portions of first insulating later 22 disposed over sidewall spacers 20 remain covered by second insulating layer 24.

Therefore, applicants submit that Tseng fails to disclose or suggest all the features of amended claim 21.

Additionally, the Office Action states that

> Tseng further teaches conventional photolithographic techniques to form node contact openings **2** in the second and first insulating layers **24** and **22** to the source/drain contact areas (column 5, lines 36-40) such that a layer comprising silicon nitride (same as Applicants' etch stop layer) and a layer comprising oxide are removed by wet etching . . . which reads on,
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> wet etching the stop layer to remove the etch stop layer over the source region, the drain region and the sidewall spacers.

(See Office Action at page 4, last paragraph through page 5, first full paragraph, emphasis added).

However, Tseng fails to disclose at column 5, lines 36-40 or anywhere else, "wet etching the buffer layer and the etch stop layer *to expose* the source region, the drain region and *the sidewall spacers*," as recited in amended claim 21.

Also, referring again to FIG. 2 of Tseng, applicants submit that Tseng fails to show "wet etching the buffer layer and the etch stop layer *to expose* the source region, the drain region and *the sidewall spacers*," as recited in amended claim 21. Rather, FIG. 2 clearly shows that sidewall spacers 20 remain covered by both first and second insulation layers 22 and 24 after node contact openings 2 are formed.

Applicants further submit that, because Tseng does not form self-aligned contact holes - as recited in method claim 21 - the Tseng contacts formed in contact openings 2 may have inferior reliability. In particular, Tseng discloses forming a contact opening 2 while both first and second insulating layers 22 and 24 remain covering sidewall spacers 20. (See, FIG. 2 of Tseng). As a result, contact opening 2 may be relatively thin. Tseng discloses "depositing a thick conductively doped first polysilicon layer 26," and FIG. 3 of Tseng shows polysilicon layer 26 formed in contact opening 2. (See, Tseng at column 5, lines 42-43). Applicants submit that when contact opening 2 is relatively thin, a polysilicon layer 26 formed in contact opening 2 may be formed with voids and therefore may have inferior reliability.

Applicants submit that Tseng fails to disclose the features of amended claim 21 noted above, and applicants request that amended claim 21 be allowed over Tseng for at least the reasons set forth above.

Regarding amended claim 1, Tseng fails to disclose "dry etching the first interlayer insulating film until portions of the etch stop layer disposed over the source region, the drain region and the sidewall spacers are exposed," as recited in amended claim 1, for at least the same reasons given above with regard to amended claim 21.

In addition, the Office Action states that

> Tseng teaches conventional photolithographic techniques to form node contact openings **2** in the second and first insulating layers **24** and **22** to the source/drain contact areas (column 5, lines 36-40) such that a layer comprising silicon nitride (same as Applicants' etch stop layer) and a layer comprising oxide are removed by wet etching . . . which reads on,
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> wet etching the stop layer to remove the etch stop layer over the source region, the drain region and the sidewall spacers (column 4, lines 18-20)

(See Office Action at page 7, last paragraph through page 8, first full paragraph, emphasis added).

However, Tseng fails to disclose "wet etching the etch stop layer to remove the portions of the etch stop layer disposed over the source region, the drain region and the sidewall spacers," as recited in amended claim 1, either at column 5, lines 36-40, column 4, lines 18-20, or anywhere else.

In addition, referring again to FIG. 2, applicants submit that Tseng fails to show "wet etching the etch stop layer to remove the portions of the etch stop layer disposed over the source region, the drain region *and the sidewall spacers*," as recited by amended claim 1. Rather, FIG. 2 shows that both first and second insulating layers 22 and 24 of Tseng remain covering sidewall spacers 20, and the Office Action characterizes a portion of insulating layer 22 of Tseng as the etch stop layer of amended claim 1. (See Office Action at page 7, paragraph 3; and at page 8, first incomplete paragraph). Thus, applicants fail to see where Tseng discloses "wet etching the etch stop layer to remove the portions of the etch stop layer disposed over the source region, the drain region *and the sidewall spacers*," (emphasis added) as recited in amended claim 1.

Applicants again note that, because Tseng does not form self-aligned contact holes, its constituent contacts formed in the contact openings 2 may have inferior reliability.

In sum, applicants submit that Tseng fails to suggest or disclose all of the features recited in amended claim 1. Therefore, applicants request that amended claim 1 be allowed over Tseng along with its dependencies, 2, 3, 5, 8-10, and 12-20.

Respectfully submitted,

Volentine & Whitt, P.L.L.C.

/Stephen R Whitt/

Stephen R. Whitt
Registration No. 34,753

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Volentine & Whitt, PLLC
One Freedom Square
11951 Freedom Drive, Suite 1260
Reston VA 20190
Tel. No. 571-283-0720
Fax No. 571-283-0740